

IN THE CLAIMS

Please amend the claims as follows:

- 1 1. (Withdrawn) A method of p-type doping in ZnO comprising:
2 forming an acceptor-doped material having ZnO under reducing conditions,
3 thereby insuring a high donor density; and
4 annealing the specimens of said acceptor-doped material at intermediate
5 temperatures under oxidizing conditions so as to remove intrinsic donors and activate
6 impurity acceptors.
- 1 2. (Withdrawn) The method of claim 1, wherein said reducing conditions comprise a
2 hydrogen containing atmosphere.
- 1 3. (Withdrawn) The method of claim 1, wherein said reducing conditions comprise a
2 non- hydrogen containing atmosphere.
- 1 4. (Withdrawn) The method of claim 1, wherein said acceptor-doped material comprises
2 a substrate, a n-type ZnO layer deposited on said substrate, and a p-type layer deposited
3 on said n-type ZnO layer.
- 1 5. (Withdrawn) The method of claim 1, wherein said intermediate temperatures
2 comprise a temperature range between 200 °C and 700 °C.
- 1 6. (Withdrawn) A method of forming p-n junctions using p-type ZnO comprising:
2 forming an acceptor-doped material having ZnO under reducing conditions,
3 thereby insuring a high donor density; and

annealing the specimens of said acceptor-doped material at intermediate temperatures under oxidizing conditions so as to remove intrinsic donors and activate impurity acceptors.

7. (Withdrawn) The method of claim 6, wherein said reducing conditions comprise a hydrogen containing atmosphere.

8. (Withdrawn) The method of claim 6, wherein said reducing conditions comprise a non-hydrogen containing atmosphere.

9. (Withdrawn) The method of claim 6, wherein said acceptor-doped material comprises a substrate, a n-type ZnO layer deposited on said substrate, and a p-type layer deposited on said n-type ZnO layer.

10. (Withdrawn) The method of claim 6, wherein said intermediate temperatures comprises a temperature range between 200 °C and 700 °C.

11. (Currently Amended) A wide band gap semiconductor device comprising:

a substrate;

an annealed n-type ZnO layer directly positioned on said substrate; and

an annealed p-type ZnO layer directly positioned on said n-type ZnO layer, said annealed p-type ZnO layer uses an intrinsic donor to increase donor concentration and high impurity acceptor density of an acceptor dope material, said intrinsic donor is removed during annealing ~~has increased p-type conductivity by removing hydrogen interstitials or intrinsic donors to thereby activate impurity acceptors.~~

12. (Previously Presented) The wide band gap semiconductor device of claim 11,
wherein said acceptor-doped material is exposed to a hydrogen containing atmosphere.

13. (Previously Presented) The wide band gap semiconductor device of claim 11,
wherein said acceptor-doped material is exposed to a non- hydrogen containing
atmosphere.

14. (Cancelled).

15. (Cancelled).

16. (Currently Amended) A p-n junction comprising:

a substrate;

an annealed n-type ZnO layer directly positioned on said substrate; and

an annealed p-type ZnO layer directly positioned on said n-type ZnO layer, said
annealed p-type ZnO layer uses an intrinsic donor to increase donor concentration as well
as high impurity acceptor density of an acceptor dope material, said intrinsic donor is
removed during annealing~~has increased p-type conductivity by removing hydrogen~~
~~interstitials or intrinsic donors to thereby activate impurity acceptors~~

17. (Previously Presented) The p-n junction of claim 16, said acceptor-doped material is
exposed to a hydrogen containing atmosphere .

18. (Previously Presented) The p-n junction of claim 16, wherein said acceptor-doped
material is exposed to a non- hydrogen containing atmosphere.

19. (Cancelled)

1 20. (Cancelled)